HCI 4.0mm Pitch wire to board Connectors

1. SCOPE

1.1. Content

This specification covers the requirements for product performance, test methods and quality assurance provisions of HCI 4.0mm Pitch wire to board Connectors

Applicable product description and part numbers are as shown in Fig.5.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Fig 4 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed in 17-JUL-2023. The Qualification Test Report number for this testing is 501-160840.

2. APPLICABLE DOCUMENTS AND FORMS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1. TE Connectivity Specifications

114-160464	Application Specification
501-160840	Qualification Test Report

2.2. Commercial Standards and Specifications

EIA-364	Electrical Connector/Socket Test Procedures Including Environmental Classifications

2.3. Reference Documents

109-1	General Requirements for Testing

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3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable TE drawing.

A. Housing (Socket, Header): Thermoplastic, UL94V-0

B. Contacts: Copper Alloy, Tin plaing over Nickel plating.

3.3. Ratings

A. Voltage Rating: 300 V AC/DC

B. Current Rating

Number of Circuits	Current(A)					
	#16	#18	#20	#22	#24	#26
2 Pos.	12	10	8	5	4	3
3 Pos.	11	9	7	5	4	3
4,5,6,8 Pos.	10	8	6	5	4	3
10,12 Pos.	9	7	6	5	4	3
14 Pos.	9	7	6	4.5	4	3

Fig.1 Current Rating

C. Temperature Rating: –25°C to +85°C

3.4. Performance Requirements and Test Description

The product should meet the electrical, mechanical and environmental performance requirements specified in Figure 2. All tests shall be performed at ambient environmental conditions otherwise specified.

3.5. Test Requirements and Procedure Summary

Test Description	Requirement	Procedure
Examination of Product	Product shall be conforming to the requirements of applicable product drawing and applicable Specification	Visual and Dimensional Inspection Test Procedure for Electrical Connectors. EIA-364-18
Electrical		
Contact Resistance (Low Level)	10 mΩ Max. (Initial) 20 mΩ Max. (final)	Mate connectors: apply a maximum voltage of 20 mV and a current of 10 mA(DC). EIA-364-06A
Dielectric Withstanding Voltage	There shall be no breakdown nor flashover.	Between two adjacent contacts apply voltage of per 1 minute. According to EIA-364-20A. Initial： AC 1500V Final： AC 1000V EIA-364-20A
Insulation Resistance	1000 MΩ Min. (Initial) 500 MΩ Min. (final)	The insulation resistance shall be measured between two adjacent terminations having a minimum spacing, using the 500V(DC), test voltage applied per 60 seconds. EIA-364-21B.

<table>
<tr><th>Test Description</th><th>Requirement</th><th>Procedure</th></tr>
<tr><td>Temperature Rising</td><td>30°C Max.</td><td>Mate connectors: measure the temperature rise at the rated current.
EIA-364-70C</td></tr>
<tr><td colspan="3">Mechanical</td></tr>
<tr><td>Connector Mating Force&
Unmating Force</td><td>
<table>
<tr><th rowspan="2">Pos</th><th colspan="2">Initial</th><th>At 30th</th></tr>
<tr><th>Mating Force Max.</th><th>Unmating Force Min.</th><th>Unmating Force Min.</th></tr>
<tr><td>2</td><td>15N</td><td>1.0N</td><td>1.0N</td></tr>
<tr><td>3</td><td>20N</td><td>1.5N</td><td>1.5N</td></tr>
<tr><td>4</td><td>25N</td><td>2.0N</td><td>2.0N</td></tr>
<tr><td>5</td><td>30N</td><td>2.5N</td><td>2.5N</td></tr>
<tr><td>6</td><td>35N</td><td>3.0N</td><td>3.0N</td></tr>
<tr><td>8</td><td>45N</td><td>4.0N</td><td>4.0N</td></tr>
<tr><td>10</td><td>55N</td><td>5.0N</td><td>5.0N</td></tr>
<tr><td>12</td><td>65N</td><td>6.0N</td><td>6.0N</td></tr>
<tr><td>14</td><td>75N</td><td>7.0N</td><td>7.0N</td></tr>
</table>
</td><td>A male with crimped Contacts and a female Shall be mated and unmated on the same axis. Insertion and withdrawal forces. The force shall be applied with rate of 1-5 mm/sec.
(Remove the latch).
EIA 364-13E, Condition A</td></tr>
<tr><td>Durability (Repeated Mate/Unmating)</td><td>Contact Resistance :
10mΩ at initial, 20mΩ at final</td><td>Mating connectors axial insert and pull out.
The force shall be applied with rate of 25 mm/minute.
No. of cycles：30cycles
EIA 364-9C</td></tr>
<tr><td>Tensile Strength of Wire Termination</td><td>AWG 16：95N Min. AWG 22：40N Min.
AWG 18：80N Min. AWG 24：30N Min.
AWG 20：65N Min. AWG 26：15N Min.</td><td>An axial force shall be applied to pull out wire. The force shall be applied with rate of 25 mm/minute.
EIA-364-08</td></tr>
<tr><td>Contact/Pin Retention Force (from housing with primary lock)</td><td>30N Min.(Socket)
20N Min.(Header)</td><td>An axial force shall be applied to pull-out contacts. The force shall be applied with rate of 1-5 mm/sec.
EIA-364-29</td></tr>
<tr><td>Lock Retention Force</td><td>15N Min/ 2 Pos
30N Min/ 3 Pos
50N Min /4 -14 Pos</td><td>An axial force shall be applied to pull-out housing from wafer .The force shall be applied with rate of 1-5 mm/sec.
EIA-364-29</td></tr>
<tr><td>Vibration (Low Frequency)</td><td>No electrical discontinuity greater than 1 μ sec. shall occur.
Contact resistance ： Max. 20mΩ</td><td>Amplitude: 1.52mm P-P
Frequency: 10-55-10 Hz in 1 minute
Duration: 2 hours in each
X.Y.Z. axes
EIA-364-28</td></tr>
<tr><td>Hammering Shock</td><td>No electrical discontinuity greater than 1μsec. shall occur.
LLCR's variation including crimping and wire after the test shall be within 40%.</td><td>Accelerated Velocity : 980 m/s2 (100G)
Acceleration direction: Mating/unmating.
Hammering Frequency : 1 time/sec.
Hammering Times : 100,000 times</td></tr>
</table>

Test Description	Requirement	Procedure
	Environmental	
Thermal Shock	Appearance： No Physical Damage. Contact Resistance : 10mΩ at initial, 20mΩ at final Insulation Resistance : Min.1000MΩ at initial, Min.500MΩ at final Dielectric Withstanding Voltage : No breakdown nor flashover	Mate connectors 1 cycle consists of： -55±3°C（30 minutes） +85±2°C（30 minutes） No. of cycles：25 cycles. EIA-364-32B.
Humidity		Mate connectors Temperature : 40±2 °C Humidity：90% ~ 95% (RH) Period：240 hours(Continuously） EIA-364-31A.
Salt Spray	Appearance： No Physical Damage Contact Resistance : 10mΩ at initial, 20mΩ at final	Mate connectors Temperature ： 35±2 ° C Humidity ： 90% ~ 95% (RH) Salt concentration ： 5±1% Period ： 48 hours(Continuously) EIA-364-26A.
Temperature Life (Heat Aging)		Mate connectors 125±2°C， 150 hours. EIA-364-1000.
Solderability	No Physical Damage. 95% of immersed area must, show no voids, pin holes.	Solder temperature： 245±3℃ Immersion duration 3±0.5sec.
Resistance to soldering Heat	No deformation or damage to function	The sample is mounted on the substrate and soldered under the below conditions: Solder Temperature: 260±5℃ Immersion duration： 5±0.5sec. For Manual Soldering as below： Temperature:350±10℃ for 3 +1/-0 Seconds. To be no damages by the top of iron at the tines of contact.
H2S	Appearance: No Physical Damage Contact Resistance : 10mΩ at initial, 20mΩ at final	Temperature:40±2℃, Concentration:3±1ppm, Humidity： 80±5% (RH) , Period: 96hours.

Fig.2 Test Requirement and Procedure Summary

NOTE *Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Fig 2.*

3.6. Product Qualification and Requalification Test Sequence

Test Examination	Test Group (a)													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Test Sequence (b)													
Examination of Product	1	1,7	1,3	1,3	1,9	1,5	1,9	1,9	1,3	1,5	1,3	1,5	1,5	1,3
Contact/Pin Retention force	2													
Lock retention force			2											
Mating force		3												
Un-mating force		4												
Durability		5												
Insulation resistance					3,7		3,7	3,7						
Withstand Voltage					4,8		4,8	4,8						
Contact resistance		2,6			2,6	2,4	2,6	2,6		2,4		2,4	2,4	
Temperature Rise				2										
Humidity					5									
Salt Spray						3								
Thermal Shock							5							
Temperature Life								5						
Vibration										3				
Solderability											2			
Resistance to soldering Heat									2					
H2S												3		
Hammering Shock													3	
Tensile Strength of Wire Termination														2

Fig.3 Test Sequence

NOTE
(a) See paragraph 4.2.
(b) Numbers indicate sequence in which tests are performed.

4. QUALITY ASSURANCE PROVISIONS

4.1. Test Conditions

Unless otherwise specified, all the tests shall be performed in any combination of the following test conditions shown in Fig.4 .

Temperature	15°C – 35°C
Relative Humidity	45% – 75%
Atmospheric Pressure	86.6 – 106.6 kPa

Fig.4 Test Condition

4.2. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable instruction sheets and shall be selected at random from current production.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Fig.3

4.3. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.4. Acceptance

Acceptance is based on verification that the product meets the requirements in Fig.2. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.5. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

APPENDIX

The applicable product descriptions and base numbers are shown in Fig.5 .

Product Part No.	Description
X-2420266-X	Socket housing of HCI 4.0mm Pitch wire to board Connectors
X-2423324-X	Header of HCI 4.0mm Pitch wire to board Connectors
2420268-X	Socket contact of HCI 4.0mm Pitch wire to board Connectors

Fig.5 Product Part No.